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(19)

(54) FLUID FLOW DEVICE

(71) I, CHARLES FREDERICK DENNIS, a British subject, of 12, Brimstone Close, Chelsfield, Orpington, Kent, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a fluid flow device comprising a fluid flow control unit and a nozzle for providing, for example, an injector, as fine jet, or a spray device have various spray patterns.

According to the invention, there is provided a fluid flow device comprising a fluid flow control unit having an apertured resilient member on a frustoconical seat within a bore of the unit, such that, in use, the fluid flow at different parts of the resilient member will be such that the resultant pressures deform the resilient member to restrict the fluid flow to a predetermined value, and a nozzle means mounted downstream of the control unit. The device may be provided with one or more deflector means downstream of the control unit and upstream or downstream of the nozzle.

The invention will now be further described, by way of example only, with reference to the accompanying drawings, in which:—

Figure 1 is a section through a device according to the invention; and

Figures 2 to 4 are similar sections through alternative embodiments of the device.

Referring first to Figure 1, the device generally designated 1 has a bore 2 having an inlet 2*a* into which fluid flows in the direction of arrow 3. Downstream of the inlet 2*a* is an incrased diameter chamber 4 terminating in a generally frustoconical seat 5 on which rests a ring 6 of resilient material, for example rubber.

It is clear from physical principles that where the velocity of fluid flowing through the device is greatest the pressure is least. It is therefore arranged that the velocity is greatest at the central aperture of the ring so that the resultant pressures combine to deform the ring 6 inwards, thus restricting fluid flow through the ring. The ring 6 is arranged such that the restriction caused by its deformation enables a constant or predetermined fluid flow through the ring to be obtained. This arrangement is particularly suitable for water sprinkler for extinguishing fires.

In the embodiment illustrated in Figure 1, the device has, on the outlet side of the increased diameter chamber 4, a nozzle portion comprising a reduced diameter portion 7, a swirl chamber 8 and an outlet portion 9. The swirl chamber may be fitted before or after the fitting of the ring 6.

In another embodiment of the invention, illustrated in Figure 2, the device has a nozzle 9 downstream of the flow control ring 6 but instead of the swirl chamber 8, has a deflector plate 10 connected to the device and located outside the nozzle and set at an angle to the emerging fluid to cause a predetermined spray pattern.

Alternatively, as illustrated in Figure 3, two or more deflector plates 11 may be provided outside the nozzle. A deflecting device may be located between the control ring 6 and the nozzle 9.

In a further embodiment of the invention, illustrated in Figure 4, a chamber 12 is provided in the nozzle portion, which chamber 12 is dimensioned so as to impart a rotating motion to the fluid. The outlet 13 of the nozzle is located on the axis of rotation of the fluid so that the fluid emerges as a conical spray.

In an embodiment of the invention (not illustrated) the outlet portion of the nozzle is elongated to provide a flat or fan shaped spray.

The invention in its various aspects thus

provides a compact and economic combined flow control unit and nozzle.

The device can be used for either gases or liquids, and further uses are envisaged, such as for paint spray jets, jets for burners such as oil burners and cutting equipment.

WHAT I CLAIM IS:—

1. A fluid flow device comprising a fluid flow control unit having an apertured resilient member on a frustoconical seat within a bore of the unit, such that, in use, the fluid flow at different parts of the resilient member will be such that the resultant pressures deform the resilient member to restrict the fluid flow to a predetermined value, and a nozzle mounted downstream of the control unit.

2. A fluid flow device according to claim 1, wherein one or more deflector means is provided downstream of the control unit and upstream or downstream of the nozzle.

3. A fluid flow device according to claim 1 or claim 2, wherein the bore of the control unit has an increased diameter portion comprising a chamber terminating in the seat and the resilient member is ring-shaped.

4. A fluid flow device according to any one of the preceding claims, wherein the nozzle comprises a reduced diameter portion, a swirl chamber and an outlet portion.

5. A fluid flow device according to claim 2 or any claim dependent thereon, wherein said deflector located downstream of the nozzle and in the form of a plate or plates set at an angle for causing a predetermined spray pattern in fluid emerging from the nozzle.

6. A fluid flow device according to any one of claims 1 to 3, wherein a chamber is provided in the nozzle, the chamber being dimensioned so as to impart a rotating motion to fluid passing through the nozzle.

7. A fluid flow device according to claim 6, wherein the outlet of the nozzle is located on the axis of rotation of the fluid so that the fluid emerges as a conical spray.

8. A fluid flow device substantially as hereinbefore described with reference to the accompanying drawings.

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3 SHEETS

FIG.1.

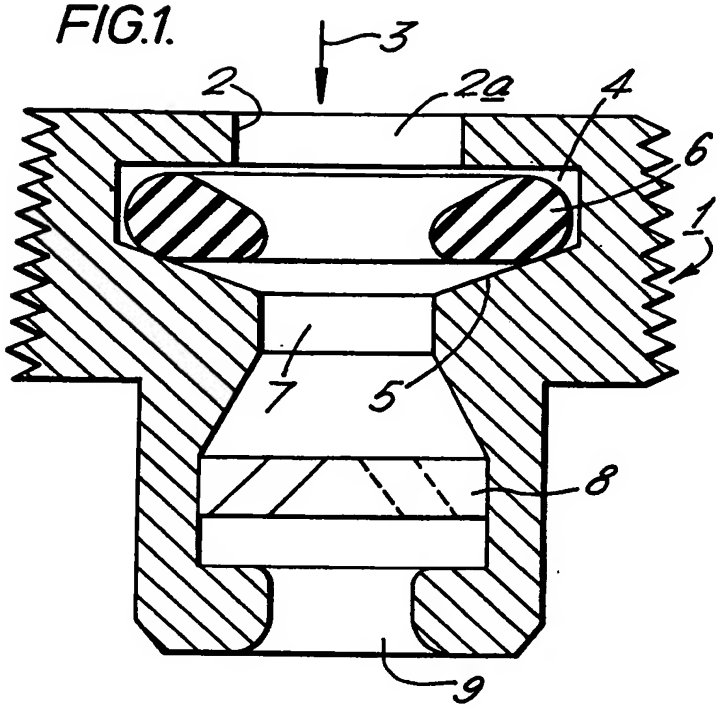


FIG.2.

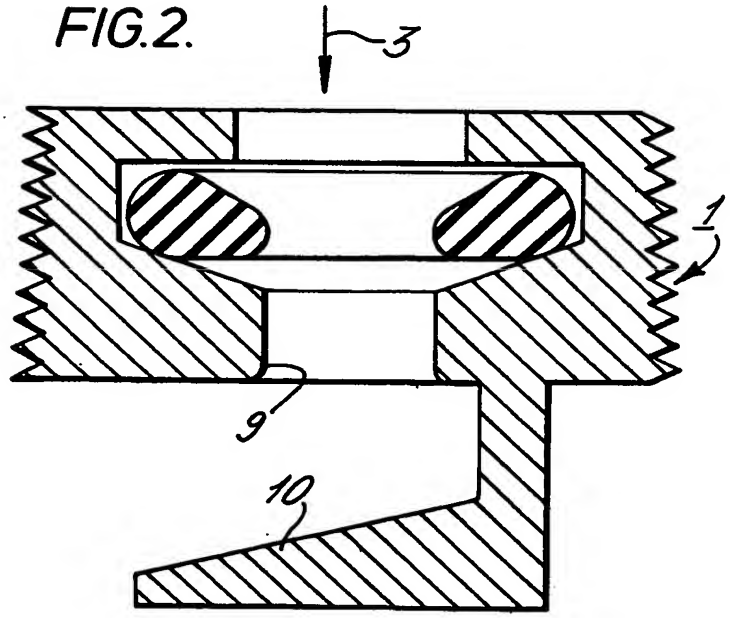
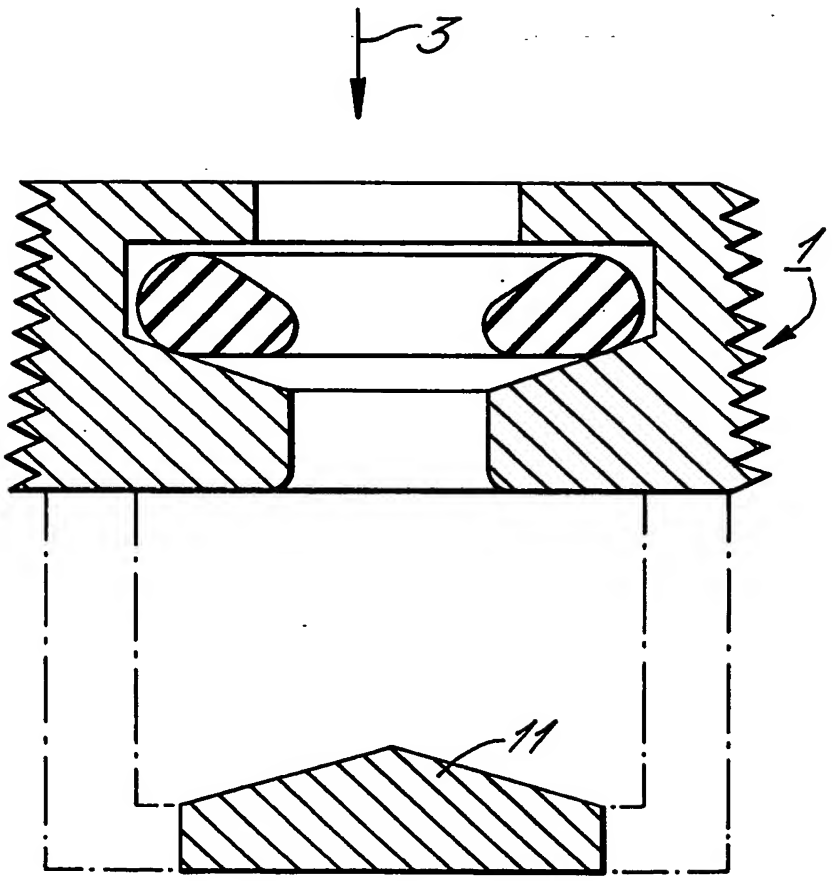


FIG.3.



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COMPLETE SPECIFICATION

FIG.4.